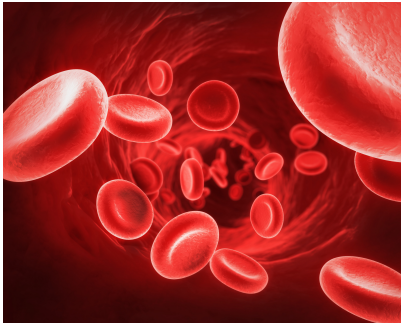


# ANEMIA

Written by U.S Immigration News  
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Anemia, commonly known as having low level of blood, is a condition when the body does not have an adequate number of healthy red blood cells for someone's age and gender. Blood cells are broadly divided into white cells (fight infection), red blood cells, and platelets (helps to blood to clot to control bleeding). The red blood cells (RBC) contain a protein called hemoglobin which helps to carry oxygen to body tissues. The RBC is mainly produced in the marrow (reddish soft tissue that is inside the bones). RBCs need to be in the right size, shape, amount and have enough hemoglobin to properly carry enough oxygen to the tissues. RBC production is facilitated by a chemical (hormone) secreted in the kidneys called erythropoietin. Proper production of RBCs also requires having right amounts of some nutrients and vitamins such as iron, Vitamin B12 and folic acid. The average life span of a good RBC is 90 to 120 days, after which it is removed from the body by the spleen.

## What causes anemia?

Anything that interferes with the process of production of RBCs or leads to their early removal leads to anemia.

## PROBLEMS WITH RBC PRODUCTION

**Insufficient nutrients and required vitamins:** Imagine the production of RBC as a manufacturing process that needs a mixture of materials in the right proportion and a properly functioning machine before you get the final product at its best quality. The production of RBC requires adequate amounts of iron, folate, and Vitamin B12 as basic materials. The iron is incorporated into hemoglobin in the RBC. It is the hemoglobin that gives the RBC its red color. Insufficient amount of any of these nutrients either due to inadequate intake or excessive loss will lead to anemia.

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**Insufficient stimulus for production:** Recall that erythropoietin is a hormone produced by the kidney that stimulates production of RBC. With certain kidney disease, levels of erythropoietin decrease. This decrease slows down the production of RBCs resulting in anemia.

**Defective major content:** Hemoglobin is the major content in the RBC. Hemoglobin formation itself can be defective. Some people are born with defects in hemoglobin production which greatly impacts the shape of the red cell. An example is Sickle cell disease where the abnormal hemoglobin makes the red cell to adopt a crescent shape. Abnormally-shaped RBCs do not last as long as normal RBCs. They are also destroyed faster, leading to anemia. The other types of inherited disease of hemoglobin are generally called hemoglobinopathy.

**Production center problems:** The bone marrow is the major hub of RBC production. For RBCs to be properly produced, the marrow must remain soft and spongy. Any condition that changes the state of the marrow affects production. Diseases that infiltrate the marrow such as cancers will cause decreases in production. There are other diseases that cause the soft tissue to be replaced by fibrous tissue (myelodysplasia). In other instances, a particular cell line in the marrow takes over and suppresses production of other cells (leukemia).

Suppression of the bone marrow can also occur with infections, drugs, and diseases where the body fights itself (autoimmune diseases).

**General suppression of production:** Long standing diseases (chronic diseases) can lead to decreased production of RBCs by various mechanisms. This type of anemia is called anemia of chronic disease. Such diseases include HIV, cancers, and rheumatoid arthritis to name a few.

## BLOOD LOSS

Normally when RBC are destroyed at the end of their life span, iron in the hemoglobin is recycled in the body. However when blood is lost from the body on an ongoing basis, there is no way to recycle the iron, so it eventually will lead to anemia. Excessive blood loss can occur with heavy menstrual bleeding in women; blood loss in stool which sometimes may not be obvious in both men and women or acute severe loss from another reason.

### EXCESSIVE DESTRUCTION OF RBC

The normal span of a RBC is 90 to 120 days before it is removed from circulation. Anything that speeds up this destruction process or shortens the life span of the RBC will lead to anemia if the bone marrow cannot match up with the rate of destruction. If RBC is sensitized (coated with what is recognized as foreign by the body) it is quickly removed and destroyed. As mentioned earlier, abnormally shaped RBC are also destroyed before the end of their life span. Diseases that lead to excessive destruction of RBC are called hemolytic anemia.

### Take home message

Anemia may be a pointer to a more serious underlying disease. Go to your doctor and check it out. It is not just okay to pop iron tablets and multivitamins without knowing the cause of anemia.

The symptoms and diagnosis of anemia will be discussed in the next article.

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This article is of educational purpose only and is not intended to replace the advice of your doctor.